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IMPLEMENTATION PLAN FOR THE COST OF A CLEAN ENVIRONMENT REPORT

Control Data Corporation

Prepared for:

Washington Environmental Research Center

29 July 1974

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THE WASHINGTON ENVIRONMENTAL RESEARCH CENTER
OFFICE OF RESEARCH AND DEVELOPMENT
U. S. ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D. C. 20460

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SECTION ONE
EXECUTIVE SUMMARY

1.1 BACKGROUND

As a result of the Clean Air Act and the Federal Water Pollution Control Act, standards have been developed to control air and water pollution. The planning, implementation, operation, and enforcement of control programs designed to meet these standards result in significant expenditures by federal, state and local governments, and also by private companies and individuals.

Under the provisions of the Acts mentioned above, the Environmental Protection Agency (EPA), has the responsibility of providing regular reports to Congress regarding the cost of pollution controls necessary to achieve the legislated standards. Previously, EPA's Office of Planning and Evaluation (OPE) had been tasked with the responsibility of producing these reports. However, beginning with the reports which are due in 1975, this responsibility has been assigned to EPA's Washington Environmental Research Center (WERC). Accordingly, the WERC staff is currently engaged in planning and contracting for studies which will enable them to meet this responsibility.

A review of previous clean water and clean air reports has identified certain overlaps in research efforts and also a need for integration and standardization of assumptions between the reports. Because of this, the WERC staff has proposed that the reports be combined into one report, to be known as the "Cost of a Clean Environment" (CCE) Report.

The advantages to this approach are both short and long term. For example, certain economic sectors require significant expenditures for both air and water pollution control (e.g., iron and steel, and petroleum refining). Knowledge of the economic impact of all environmental controls on these sectors is important for national policy development. While conducting a detailed study of such a sector, information could be determined for both air, water, and residual treatment requirements, thus reducing a potential overlap of efforts or omission of combined impacts.

The combined report approach also promotes the analysis of intermedia effects (links between air, water, and land pollution) caused by pollution abatement programs. The approach is open-ended in that considerations such as solid waste programs can be included in the report without disrupting report organization or continuity. A major advantage, however, appears to be the standardization of report assumptions, such as a constant dollar for reporting costs, standard time intervals and periods for projecting annualized costs, depreciation rates for equipment and facilities, interest rates assumptions, standard assumptions for modeling control technologies, and standard cost forecasting assumptions.

Successful development of the 1975 CCE Report will require a cooperative effort between the WERC staff, OPE, study contractors, and other government agencies conducting pollution related studies. The purpose of this plan is to help promote that cooperation by developing a common base of understanding in relation to project objectives, milestones, and potential problem areas.

1.2 GENERAL APPROACH

The following narrative describes the general approach that will be used to develop the text and related materials for the 1975 CCE Report. The overall approach employs a "top-down" philosophy by beginning with the effects of pollution and working toward identifying the sources and technologies that apply to those sources.

Report chapters and sections mentioned in the narrative refer to the report outline shown in figure 1. Task numbers shown on the report outline refer to detailed task descriptions given in section three of this plan.

Considerable material exists which documents the potential effects of pollution. Previous studies have identified the pollutants listed in figure 2 as the primary causes of these effects. A review of these studies, as well as of current efforts aimed at a further definition of pollutants and their associated effects, will be used to develop the text for portions of the Chapter III, Statement of the Problem, of the report.

The identification of pollutant sources and associated control technologies represents a significant research effort. The approach to be used is to first categorize pollutant sources by general source categories, called sectors, and then conduct detailed studies for specific source categories within the sectors. A tentative list of sectors is given in figure 3. For the specific source categories selected, alternate control technologies are identified along with associated cost functions and sufficient treatment data to determine annual costs for each alternative. This information is then expanded to give national data by sector. To facilitate the uniform gathering and recording of data at the specific source level, detailed source outlines will be prepared using the general outline shown in figure 4 as a guide.

The information and analysis produced by the detailed source studies will be used to draft portions of text for the control cost chapters (chapter V - air, and chapter VIII - water). In addition, cost functions and associated treatment data from these studies will be used to forecast abatement costs for selected years. A sample format for standard analysis summary sheets to be provided by forecast results is shown in figure 5. The summaries can provide information aggregated to state, federal region, or national levels, and can be sorted by pollutant type or by sector.

I. INTRODUCTION (WP-630)

A. Legal Requirement for Report

B. Reasons for Combining Reports

1. Potential to extend to other pollutant categories
2. Intermedia analysis
3. Standardization of definitions, assumptions, and units
4. Consistent forecasting methods and assumptions

II. EXECUTIVE SUMMARY (WP-630)

A. Purpose and Scope of Report

B. Summary and Conclusions

III. STATEMENT OF THE PROBLEM

A. Effects of Pollution (General Description) (WP-630)

B. Pollutants Responsible for Effects (WP-630)

1. Air
2. Water
3. Solid waste

C. Sources of Pollution (WP-630)

1. Stationary

a. industrial
b. power generation
c. space heating
d. municipal

2. Non-point

a. agriculture
b. mining and drilling
c. residential
d. constructio
e. urban runoff

3. Mobile - private

a. ground transportation
b. air transportation
c. water transportation

4. Mobile - commercial

a. ground transportation
b. air transportation
c. water transportation

Figure 1. Cost of Clean Environment Report Outline

D. Annual Mass (WP-530)

1. With controls
2. Without controls

E. Control Levels (WP-630)

1. Ambient
2. Emission

F. Control Methods (WP-150, WP-340, and WP-630)

G. Report Assumptions (WP-520)

IV. BENEFITS OF CONTROLLING AIR POLLUTION

A. Reduced Damage Costs

1. Human health (WP-210)
2. Esthetics (WP-220)
3. Materials (WP-230)
4. Production (WP-240)
5. Property values (WP-250)

B. Total Benefits (WP-260)

1. With 1970 controls
2. With future controls

V. COSTS OF CONTROLLING AIR POLLUTION

A. Program Costs (WP-110)

1. Research
2. Federal programs
3. State programs
4. Private programs

B. Control Costs

1. Stationary

a. industrial (WP-121)
b. power generation (WP-122)
c. space heating (WP-123)
d. municipal (WP-124)

2. Non-point

a. agriculture (WP-131)
b. mining and drilling (WP-132)
c. residential (WP-133)

3. Mobile

a. transportation (WP-141)

Figure 1 (Continued). Cost of Clean Environment Report Outline

VI. ANALYSIS OF DAMAGES AND COSTS: AIR

A. Trade-Off Analysis (WP-260)

1. SMSA, by sector

B. Trend Impacts (WP-260)

VII. BENEFITS OF CONTROLLING WATER POLLUTION

A. Reduced Damage Costs

1. Human health (WP-410)
2. Esthetics (WP-420)
3. Recreation (WP-430)
4. Materials damage (WP-440)
5. Production (WP-450)
6. Property values (WP-460)

B. Total Benefits (WP-470)

1. With 1970 controls
2. With future controls

VIII. COSTS OF CONTROLLING WATER POLLUTION

A. Program Costs (WP-310)

1. Research
2. Federal programs
3. State programs
4. Private programs

B. Control Costs

1. Point sources

a. industrial (WP-321)
b. power plants (WP-322)
c. municipal (WP-323)

2. Non-point sources

a. agriculture (WP-331)
b. urban runoff (WP-332)
c. mining (WP-333)
d. construction (WP-334)

IX. ANALYSIS OF DAMAGES AND COSTS: WATER

A. Trade-Off Analysis (WP-470)

1. Region, by sector

B. Trend Impacts (WP-470)

Figure 1 (Continued). Cost of Clean Environment Report Outline

X. SUMMARY SECTION

A. Potential Constraints (WP-550)

1. Personnel
2. Capital
3. Time
4. Resources
5. Technology

B. Mitigation of Constraints (WP-550)

1. EPA assistance
2. Assistance of other agencies

C. Analysis by Impact Categories (WP-550)

1. Federal
2. State

D. Comprehensive Multi-Media Cost Analysis

XI. APPENDIX (WP-620)

A. Supporting Studies

Figure 1 (Continued). Cost of Clean Environment Report Outline

AIR POLLUTANTS	WATER POLLUTANTS
Particulates	Heavy Metals
Sulfur Oxides	Pesticides
Carbon Monoxides	Herbicides
Hydrocarbons	Polychlorinated Biphenyls (PCB)
Nitrogen Oxides	Biochemical Oxygen Demand (BOD)
Asbestos	Total Suspended Solids
Beryllium	Total Dissolved Solids
Mercury	Temperature
Vinyl Chloride	Acidity/Alkalinity
Sulfuric Acid Mists	Fecal Coliform
	Cyanide
	Phenols
	Toxic Substances
	Nutrients
	Asbestos
	Mercury

Figure 2. Tentative List of Pollutants to be Studied

Concurrent with the detail source studies, additional studies will be conducted to determine quantifiable benefits to be gained by abating pollution, where benefits are defined as the reduction of economic damages resulting from pollution controls. Emission forecasts with and without controls will provide annual mass of pollutant data, which will be used with environmental response approximations to assist in estimating changes in benefits. Results of the benefits studies will be developed into text which will contribute to the benefits chapters of the report (chapter IV - air, and chapter VII - water).

Chapters VI and IX of the report will discuss benefits and costs of pollution control for air (chapter IV) and water (chapter IX). Problems related to the quantification of benefits, and the correlating of pollution control measures to benefits in terms of time and geography will be discussed along with tradeoffs resulting from alternate abatement policies.

Chapter X of the report will summarize potential constraints to meeting the legislated standards. Text for this chapter will be developed from the analysis of cost and emission forecasts, treatment technology data from the cost studies, and from report assumptions.

Preparation of text for the introductory chapters (I and II), and the scheduling and integrating of contributions to the report will be the responsibility of the report integration contractor, whose role is further defined in Section Two, Organizational Structure, of this plan.

SIC	Sector Description
01	Agricultural Production - Crops
02	Agricultural Production - Livestock
021	Livestock, except dairy, poultry
0211	Beef cattle Feedlots
0212	Beef cattle except Feedlots
0213	Hogs
024	Dairy Farms
025	Poultry
07	Agricultural Services
08	Forestry
11	Anthracite Mining
12	Bituminous Coal and Lignite Mining
14	Mining and Quarrying of Non-Metallic Minerals except Fuels
1422	Crushed and Broken Stone
1442	Crushed Stone, Sand and Gravel
20	Food and Kindred Products
201	Meat Products
2011	Meat Packing Plants
2016	Poultry Dressing Plants
202	Dairy Products
2021	Creamery Butter
2023	Condensed and Evaporated Milk
2024	Ice Cream and Frozen Desserts
2026	Fluid Milk
203	Canned and Preserved Fruits and Vegetables
2033	Canned Fruits, Vegetables, Preserves, Jams and Jellies
2037	Frozen Fruits, Fruit Juices, and Vegetables
204	Grain Mill Products
2048	Prepared Feeds and Feed Ingredients
2061	Cane Sugar, except refining
2062	Cane Sugar, refining
2063	Beet Sugar
2077	Animal and Marine Fats and Oils
2082	Malt Beverages
209	Canned and Preserved Seafood Processing
2091	Canned and Cured Fish and Seafoods
2092	Fresh or Frozen Package Fish and Seafoods
2095	Roasted Coffee
22	Textile Mill Products
221	Broad Woven Fabric Mills, Cotton
223	Broad Woven Fabric Mills, Wool
2261	Finishers of Broad Woven Fabrics of Cotton
2262	Finishers of Broad Woven Fabrics of Man-made fibers and silk
24	Lumber and Wood Products
2411	Logging Camps
242	Sawmills and Planing Mills

Figure 3. Tentative List of Sectors by Standard Industrial Classification (SIC)

SIC	Sector
243	Millwork, Veneer, Plywood
26	Paper and Allied Products
2611	Pulp Mills
2621	Paper Mills, except building paper mills
2631	Paper Board Mills
2661	Building Paper Mills
28	Chemicals and Allied Products
281	Industrial and Inorganic Chemicals
2812	Alkalies and Chlorine
2816	Inorganic Pigments
2819	Industrial Inorganic Chemicals not elsewhere identified
282	Plastic Materials and Synthetic Resins
2821	Plastic Materials, Synthetic Resins and Non-Vulcanizable Elastomers
2822	Synthetic Rubber
2841	Soap and Other Detergents
2865	Cyclic Crudes and Cyclic Intermediates, Dyes and Organic Pigments
2869	Industrial Organic Chemicals, not elsewhere identified
287	Agricultural Chemicals
2873	Nitrogenous Fertilizers
2874	Phosphate Fertilizers
2879	Pesticides and Agricultural Chemicals
2895	Carbon Black
2899	Chemicals and Chemical Preparations not elsewhere classified
29	Petroleum Refining and Related Industries
291	Petroleum Refining
2951	Paving Mixtures and Blocks
299	Miscellaneous Products of Petroleum and Coal
30	Rubber and Miscellaneous Plastic Products
3011	Tires and Inner tubes
31	Leather and Leather Products
3111	Leather Tanning and Finishing
32	Stone, Clay, Glass and Concrete Products
3211	Flat Glass
3221	Glass Containers
3226	Insulation Fiberglass
3241	Cement, Hydraulic
3244	Lime Manufacturing
327	Concrete, Gypsum, and Plaster products
3271	Concrete Block and Brick
3292	Asbestos Products
3293	Gaskets, Packing and Sealing Devices
3299	Non-metallic Mineral Products not elsewhere classified
33	Primary Metal Industries
331	Blast Furnaces, Steel Works, and Rolling and Finishing Mills

Figure 3 (Continued). Tentative List of Sectors by Standard Industrial Classification (SIC)

SIC	Sector
3312	Blast Furnaces including coke ovens, steel works, and rolling mills
3313	Electrometallurgical Products
3315	Steel Wire Drawing, Steel Nails and Spikes
3316	Cold Rolled Steel Sheets, Strips, and Bars
3317	Steel Pipe and Tubes
332	Iron and Steel Foundries
3321	Gray Iron Foundries
3322	Malleable Iron Foundries
3323	Steel Foundries
333	Primary Smelting and Refining of Nonferrous Metals
3331	Primary Smelting and Refining of Copper
3332	Primary Smelting and Refining of Lead
3333	Primary Smelting and Refining of Zinc
3334	Primary Production of Aluminum
3341	Secondary Smelting and Refining
335	Rolling, Drawing, and Extending of Nonferrous Metals
3362	Brass, Bronze, Copper, and Copper Base Alloy Foundries
339	Miscellaneous Primary Metal Products
34	Fabricated Metal Products, except Machinery and Transportation Equipment
3471	Electroplating, Plating, Polishing, Anodizing and Coloring
36	Electrical and Electronic Equipment and Supplies
37	Transportation Equipment
40	Railroad Transportation
41*	Local and Suburban Transit and Inter-Suburban Highway Passenger Transportation
42	Motor Freight Transportation and Warehousing
4221	Grain Handling
44	Water Transportation
45	Air Transportation
46	Pipelines, except natural gas
49	Electric, Gas, and Sanitary Services
491	Electric Services
4911	Steam Electric Powerplants
4922	Natural Gas Transmission
4923	Natural Gas Distribution
493	Combination Electric, Gas, and other utilities
4952	Sewage Systems
4953	Refuse Systems
4959	Sanitary Services not elsewhere classified
51	Wholesale Trade, non-durable goods
55	Automotive Dealers and Gasoline Service Stations
5541	Gasoline Service Stations

*Will include private transportation for purposes of this report.

Figure 3 (Continued). Tentative List of Sectors by Standard Industrial Classification (SIC)

SIC	Sector
72	Personal Services
7216	Dry Cleaning Plants except rug cleaning
88	Private Households

Figure 3 (Continued). Tentative List of Sectors by Standard Industrial Classification (SIC)

I. DESCRIPTION OF SECTOR

A. Nature

B. Products

C. Size

1. Output/capacity
2. Number of facilities
3. Employment

D. Geographic Location

E. Technology

F. Age of Facilities

G. Activity Status through 1985

1. Changes in the demand for the product
2. Financial situation

a. prices
b. interest rates
c. industry financial profile

(1) profits before taxes
(2) annual cash flow
(3) cost structure
(4) market value of assets

3. Resource availability

a. energy
b. raw materials

4. Lifespan of pollution controls
5. Projected activity output and number of facilities

II. DESCRIPTION OF POLLUTION AND CONTROLS

A. List of Pollutants by Process

B. Raw Waste Load (Uncontrolled) Per Unit Output

C. Raw Waste Load Versus Another Available Size Indicator (Water Use, Employment, Value Added)

D. Pollution Control Options (Including Production Process Modification)

E. Anticipated Control Strategies Through 1985 (Compliance with Regulations)

Figure 4. General Outline for Sector Studies

F. Control Cost Versus Facility Size

G. Source of Ultimate Disposal and Means of Precluding Serious Intermedia Transfers

III. AGGREGATED CONTROL COSTS

A. Definition of All Assumptions and Calculation Methods

B. Present Costs

C. Annual Costs Through 1985

1. Total capital
2. Annualized capital
3. Annual O and M
4. Financing costs

D. Costs Directly Attributable to P.L. 91-604 and 92-500

E. Sensitivity Analyses

F. Comparison with Previous Estimates

G. Aggregations for Specifically Legislated Periods or Targets

IV. ECONOMIC IMPACT ANALYSIS

A. Price Effects

B. Change in Demand

C. Output Effects

1. Plant closures
2. Production reduction

D. Employment Effects

E. Financial Effects

1. Profits
2. Capital availability

V. INTERMEDIA IMPACTS

Estimates of new pollution in other media as a result of implementing proposed control strategies.

VI. OVERALL SENSITIVITY ANALYSIS AND DISCUSSION OF CONFIDENCE OF REPORTED VALUES

VII. APPENDIX

A. Detailed Calculation Algorithm

B. Worksheets

Figure 4 (Continued). General Outline for Sector Studies

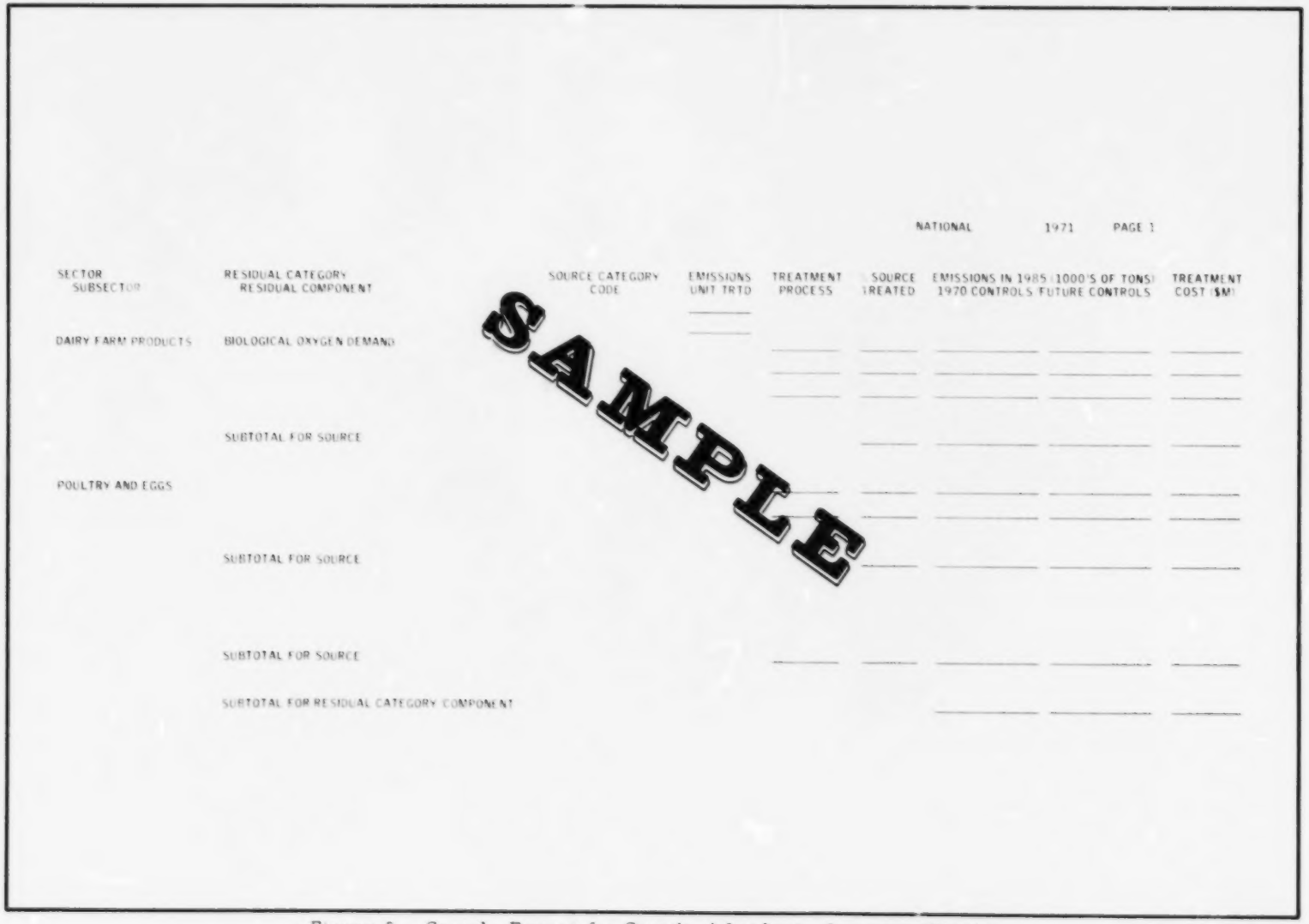


Figure 5. Sample Format for Standard Analysis Summary Sheets

1.3 ANTICIPATED CONTRACT STUDIES

The Washington Environmental Research Center is currently developing Requests for Proposals (RFP's) in anticipation of awarding contracts before September 15, 1974, in support of the 1975 Cost of a Clean Environment Report. These contracts will provide for the review, adaptation, and where appropriate, integration of results from ongoing studies into pollution control technologies, costs, and benefits. Other contracts will determine the cost of government support programs, develop forecasts and constraints affecting future emission levels and abatement costs, and provide for report integration services.

1.3.1 Ongoing Cost of Control Studies

Development of the 1975 CCE Report will draw heavily upon the following pollution control cost studies which are already in progress.

1.3.1.1 Industrial Treatment Cost Studies - EPA has a contract in progress with Battelle Columbus Laboratories (BCL) to assess for industrial sources the cost of compliance with air pollution standards. Under this contract BCL will develop estimates of investments and annual operating costs, identify control techniques, and estimate emissions for:

- Sources affected by Ambient Air Quality Standards
- Sources affected by New Source Performance Standards on Hazardous Polluting Substances Emission Standards.

A report will be prepared on an industry basis, and will be available in February 1975.

EPA also has a contract in progress with the Center for Industrial Water Quality Management of Vanderbilt University, to conduct studies on best available technology (BAT) for 27 industrial categories and to evaluate the effectiveness of in-plant process change as an alternative or supplement to end-of-the-pipe treatment. The study will evaluate typical industrial practices for selected industries with respect to:

- Reduction of water use
- Reuse of process and treated waters
- In-process reduction of pollutants
- By-product recovery
- Plant process modifications and raw material substitutions.

The results of studies from this contract will be available by February 1975.

1.3.1.2 Survey of Needs for Municipal Wastewater Facilities - EPA's Municipal Waste Water Systems Division, within the Office of Water and Hazardous Materials, is currently updating the Needs Survey, which was originally conducted in 1973 in accordance with Section 516 (b) (2) of the 1972 Amendments to the Federal Water

Pollution Control Act. This survey covers publicly-owned treatment and collection facilities that are eligible for federal assistance. The updated survey results will be used to provide cost data on public sewage systems. This report will be available in February 1975.

1.3.1.3 National Commission on Water Quality - The National Commission on Water Quality (NCWQ) is contracting for studies to determine the technological aspects of achieving the 1977 and 1983 standards of the Federal Water Pollution Control Act. Related NCWQ study contracts will investigate the resultant level of water quality, the associated industrial and municipal treatment costs, and the ultimate impact on regional and national economic and social conditions. Although results of these studies will not be available for inclusion in the CCE Report, EPA/WERC will coordinate closely with NCWQ on analysis methods, data sources, etc.

1.3.2 EPA/WERC Contracts

The following tasks will be accomplished through anticipated contracts in support of the 1975 CCE Report. These contracts may be written for portions of, or groups of tasks.

1.3.2.1 Air Pollution and Cost Estimations - The purpose of this contract is to assist in producing control cost information on sources of air pollution. Services performed under this contract will include the following:

- Analysis of transportation studies
- Impact studies for air pollution control alternatives
- Examine State Implementation Plans (SIP's) to assist in regional impact studies
- Develop econometric approaches for those industry sources excluded in the Battelle contract
- Program costs.

1.3.2.2 Water Cost Compilation and Aggregation - The technology cost information provided by the Vanderbilt Study (paragraph 1.3.1) will contain cost information at the plant level. This information will be aggregated to the national level, by industry, under this contract. The contractor selected for this effort will also integrate the data from other water studies in preparation for Strategic Environmental Assessment System (SEAS) forecasts, and will prepare the text for those sections of the report dealing with water pollution control costs (chapter VIII).

1.3.2.3 Water Program Costs - This study will determine the costs of research programs, of federal and state control agency programs (e.g., administrative and enforcement costs), and of private programs (e.g., administrative and legal costs), designed to meet the provisions of the Federal Water Pollution Control Act.

1.3.2.4 Control Methods and Costs for Non-Point Sources of Water Pollution - This study will develop information on control technologies for pollutants resulting from agriculture, urban runoff, mining, and construction sources. An RFP is currently being prepared for this contract.

1.3.2.5 Process Change Cost Study - A study is planned to assess the difference between "add-on" costs and "modification" costs for industries not covered under the Vanderbilt contract (paragraph 1.3.1.1). EPA's current estimates assume the purchase of new pollution control equipment to accomplish control objectives, when, in fact, many companies may achieve objectives by modifying internal production processes. Contract award for this study is expected in mid-September 1974, with the study lasting until April 1975.

1.3.2.6 Population Risk Study - A benefits study will correlate ambient air quality data to population densities. Contour maps depicting ambient air levels will be compared with census maps depicting population densities. The purpose of the study is to determine the number of people subject to health risks resulting from air pollution. Contract award for this study is targeted for October 15, 1974, with study results to be available by February 15, 1975.

1.3.2.7 Forecasts and Constraints Support - Efforts to forecast pollution levels and associated control costs for use in the 1975 CCE Report will take advantage of the capabilities offered by SEAS, developed by EPA/WERC. In addition, the reporting capabilities offered by SEAS will be used to produce report tables requiring varying levels of aggregation.

Phase III development of SEAS is currently in progress and will provide expanded capabilities for use in preparing the 1975 CCE Report.

RFP's are currently being developed to obtain support for the Forecasts and Constraints effort in the following areas:

- Modification of the SEAS post-processor module (POSTCOMP) to provide summary report options needed for the CCE Report
- The operational design and execution of SEAS scenarios to provide the desired cost and emissions forecasts
- The analysis of forecasts necessary to produce forecasts and constraints text and summary tables.

1.3.2.8 Report Integration Services - An RFP is currently being developed to provide integration support for all efforts related to the production of the 1975 CCE Report. The contractor selected will monitor EPA/WERC contracts with respect to data compatibility and milestone dates. The contractor will be responsible for report construction efforts, including editing and preparing draft and final reports.

1.4 REPORT DEVELOPMENT SCHEDULE

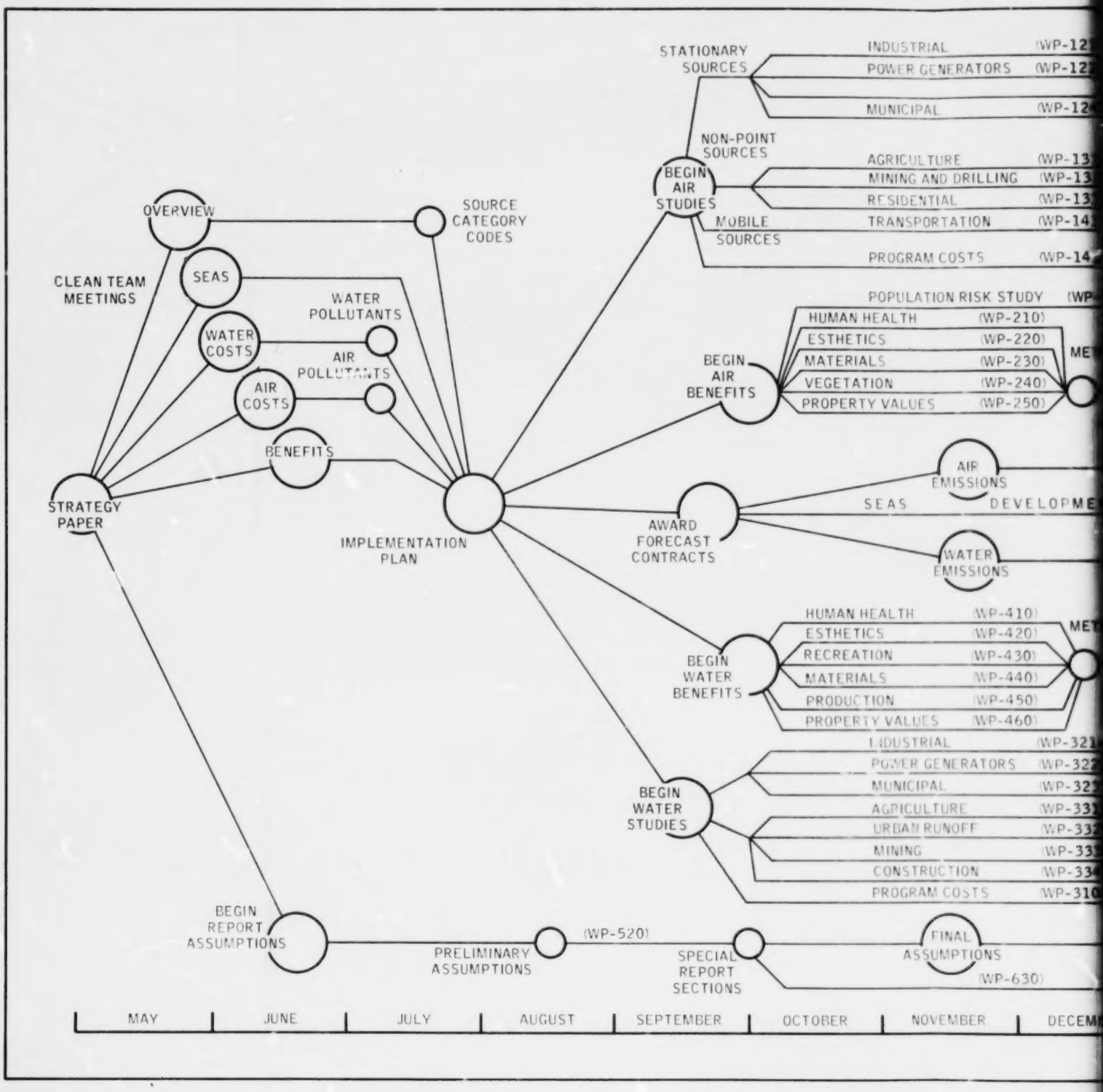
Figure 6 presents a network development plan for the 1975 CCE Report. Detailed milestone schedules for each task/subtask are contained as part of the task descriptions in section three of this plan. Milestone dates shown in figure 6 and in the task descriptions are summarized below.

- Implementation Plan Completed 7/29/74
- Preliminary Assumptions Completed 8/15/74
- Study Contracts Awarded 9/15/74
- Forecasts and Constraints Support Contract Awarded 9/20/74
- Preliminary Emissions Forecasts Completed 11/20/74
- Final Report Assumptions Completed 11/20/74
- Detailed Source Studies Completed 2/01/75
- SEAS Data Load Completed 3/03/75
- Benefits Drafts Completed 3/11/75
- Final Cost Forecasts Completed 4/07/75
- Draft Sections Completed 5/01/75
- Report Integration Completed 5/15/75
- WERC Draft Completed 5/25/75

1.4.1 Potential Schedule Constraints

The tightest schedule constraints occur in the April-May period of 1975 when individual report contributions are to be integrated into a draft report. Early agreement on a detailed report outline and extensive interactions between responsible work groups will be important factors in meeting the May 25, 1975, WERC draft milestone.

The integration of detailed source data for loading in SEAS provides potential difficulties if the data collection efforts are not effectively coordinated. Efforts to see that the detailed source outlines are used properly in the cost studies should provide assistance in this area. An early determination needs to be made as to the extent that the outlines can be imposed on existing contracts (e.g., Battelle - Air Costs).


STATIONARY SOURCES
INDUSTRIAL
POWER GENERATORS
MUNICIPAL
NON-POINT SOURCES
BEGIN AIR STUDIES
AGRICULTURE
MINING AND DRILLING
RESIDENTIAL
MOBILE SOURCES
TRANSPORTATION
PROGRAM COSTS
OVERVIEW
SOURCE CATEGORY CODES
CLEAN TEAM MEETINGS
SEAS
WATER POLLUTANTS
WATER COSTS
AIR POLLUTANTS
AIR COSTS
BENEFITS
POPULATION RISK STUDY
HUMAN HEALTH (WP-210)
ESTHETICS (WP-220)
MATERIALS (WP-230)
VEGETATION (WP-240)
PROPERTY VALUES (WP-250)
BEGIN AIR BENEFITS
AIR EMISSIONS
SEAS
AWARD FORECAST CONTRACTS
WATER EMISSIONS
STRATEGY PAPER
IMPLEMENTATION PLAN
HUMAN HEALTH (WP-410)
ESTHETICS (WP-420)
RECREATION (WP-430)
MATERIALS (WP-440)
PRODUCTION (WP-450)
PROPERTY VALUES (WP-460)
BEGIN WATER BENEFITS
INDUSTRIAL
POWER GENERATORS
MUNICIPAL
AGRICULTURE
URBAN RUNOFF
MINING
CONSTRUCTION
PROGRAM COSTS
BEGIN WATER STUDIES
BEGIN REPORT ASSUMPTIONS
PRELIMINARY ASSUMPTIONS
(WP-520)
SPECIAL REPORT SECTIONS
FINAL ASSUMPTIONS
(WP-630)
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER

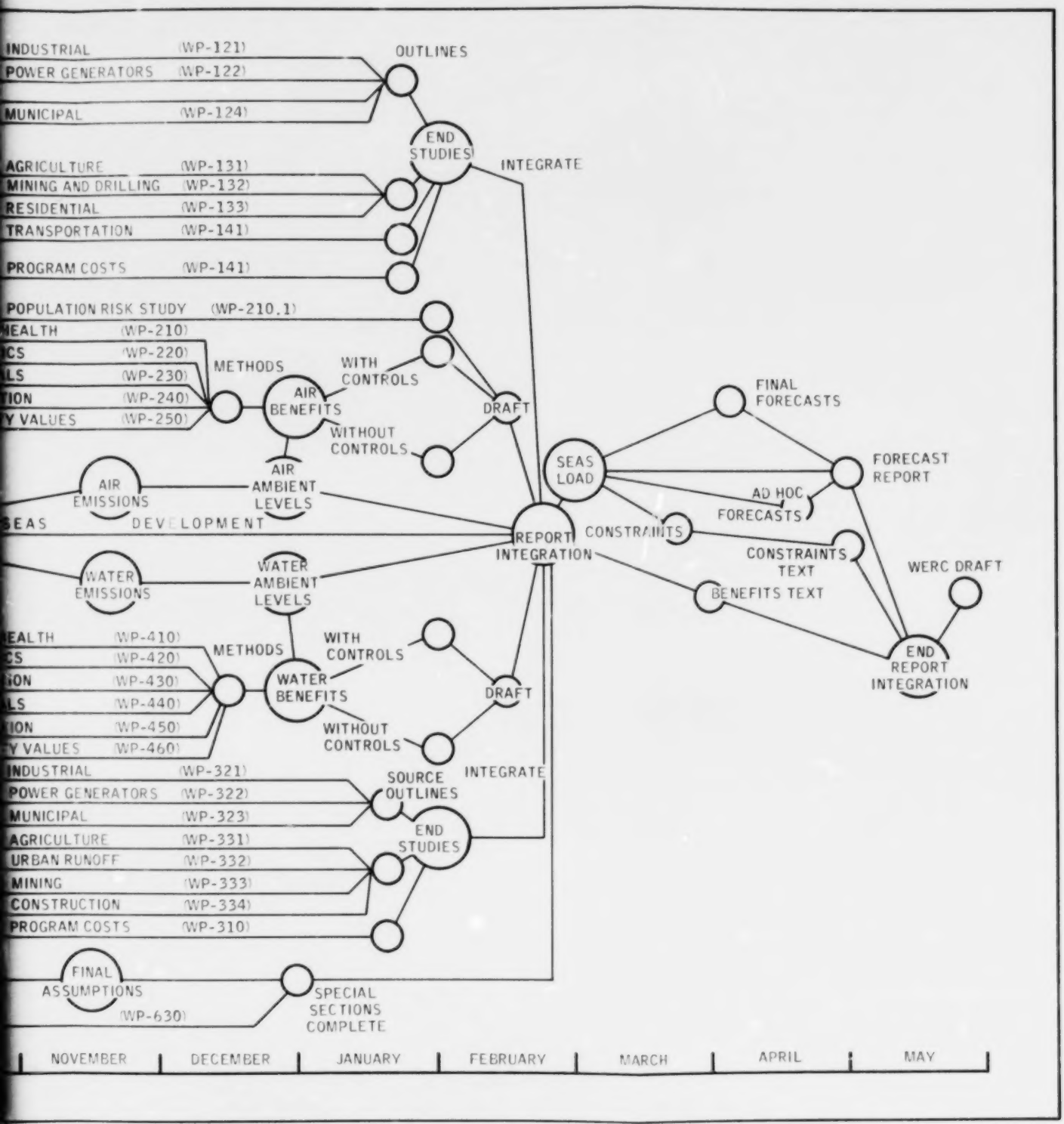


Figure 6. Development Plan for CCE Report

SECTION TWO
PROJECT ORGANIZATION AND CONTROL

2.1 PROJECT ORGANIZATIONAL STRUCTURE

The development of the 1975 Cost of a Clean Environment Report will require a cooperative effort among organizations within EPA, selected contractors, and government agencies with the potential to contribute to the report. Figure 7 presents the overall organizational structure designed to facilitate this cooperation.

With the exception of the chapters on benefits (chapters IV and VII), most of the information-gathering, analysis, and text preparation will be accomplished by contract support. Integration contractors for the air and water subject areas will be responsible for scheduling contributions and preparing text for subject area drafts. Similar responsibilities for the benefits chapters will be performed by members of the WERC staff. A report integration contractor will be responsible for receiving subject area drafts and for preparing draft and final reports. The preparation of introductory sections (chapters I and II) and the integration of special studies into the report also will be accomplished by the report integration contractor.

The project director, project manager, and project leaders are members of the WERC staff. The project director will provide overall policy guidance to the individual project leaders and also to the integration contractor. The project manager will provide the necessary technical guidance and coordination. The project leaders will handle contracting tasks (RFP's, proposal analysis, and aware procedures) and will monitor the resultant contracts with the assistance of the report integration contractor. Extensive interactions between the project study leaders and the integration contractors are expected to minimize study overlaps and to assure a uniform perception of report assumptions.

The report integration contractor will monitor study efforts with respect to milestone dates and study assumptions. This contractor will schedule final report contributions and will prepare the draft and final reports.

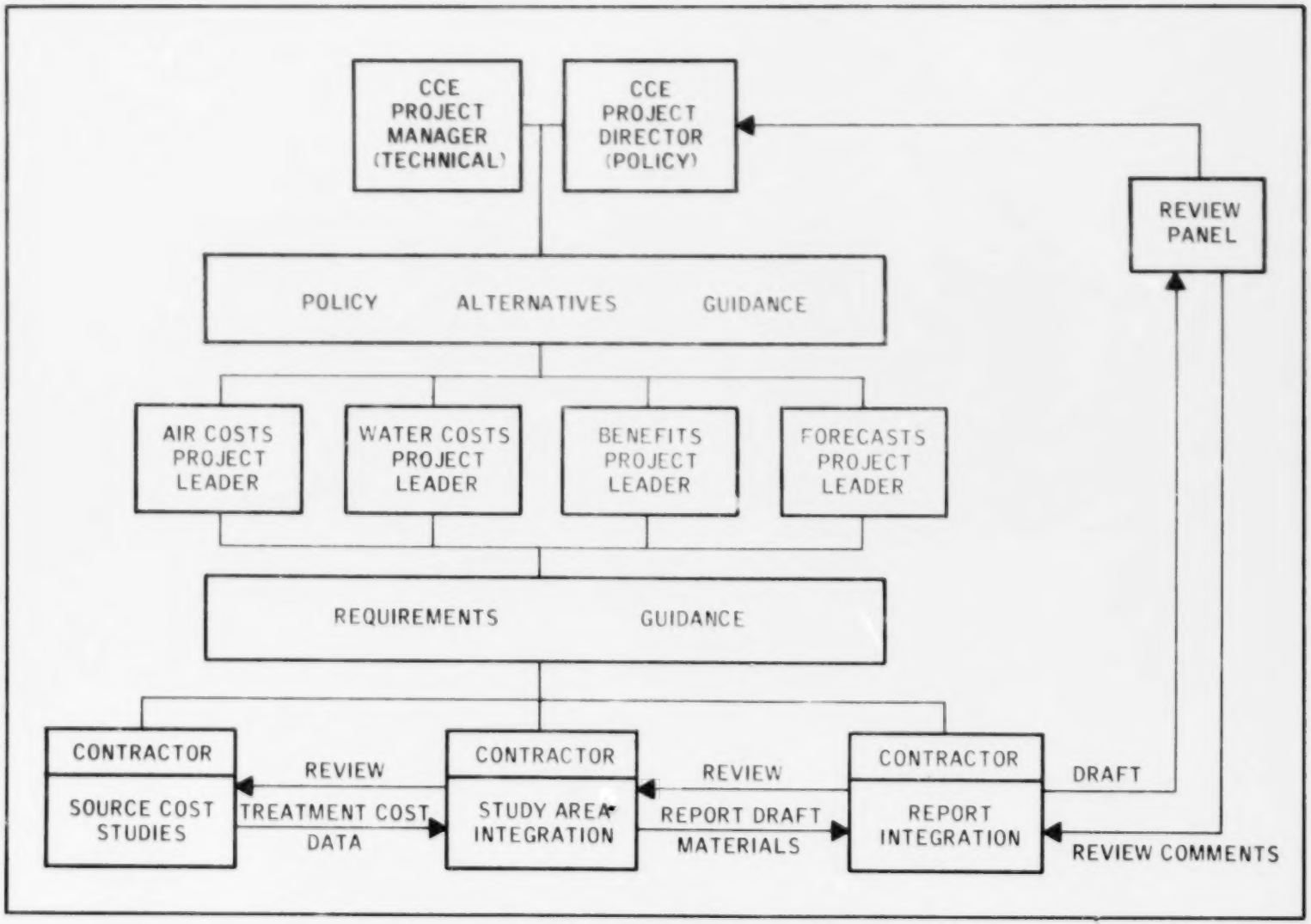


Figure 7. CCE Project Organizational Structure

2.2 REVIEW MEETINGS

Biweekly review meetings will be scheduled to discuss information sources, the progress of studies, preliminary results, and potential problems in terms of report integration and compliance with milestone dates. These meetings will be chaired by the CCE Project Director and will be attended at a minimum by the CCE project leaders and the integration contractors. The report integration contractor will prepare tentative agendas for each of these meetings far enough in advance so that attendance by representatives from other EPA offices, government agencies, and contractors may be solicited for participation in discussion of topics related to their areas of interest. Potential sources for participating attendees include the following:

- EPA Offices
  - Planning and Evaluation
  - Water Program Operations
  - Water Planning and Standards
  - Pesticide Programs
  - Radiation Programs
  - Solid Waste Management
  - Enforcement and General Counsel
  - Legislation
  - Air Quality Planning and Standards
  - Mobile Source Air Pollution Control
- Other Agencies
  - Department of Transportation
  - Department of Commerce
  - Office of Management and Budget
  - Council on Environmental Quality
  - Department of Housing and Urban Development
  - National Commission on Water Quality.

SECTION THREE
TASK DEFINITIONS

3.1 WORK PACKAGE STRUCTURE

Figure 8 shows the work package breakdown proposed for the performance of all tasks required to produce the Cost of Clean Environment Report. Tasks are identified as falling within one of six general work package series:

- Air Costs
- Air Benefits
- Water Costs
- Water Benefits
- Forecasts and Constraints
- System Integration Services.

Task descriptions for each package shown in this chart are presented below in numerical order.

3.2 PACKAGE 110, AIR PROGRAM COSTS

3.2.1 Task Description

As stated in Section 312 (a) of the Clean Air Act, "a comprehensive study of the cost of program implementation by affected units of government;" is required.

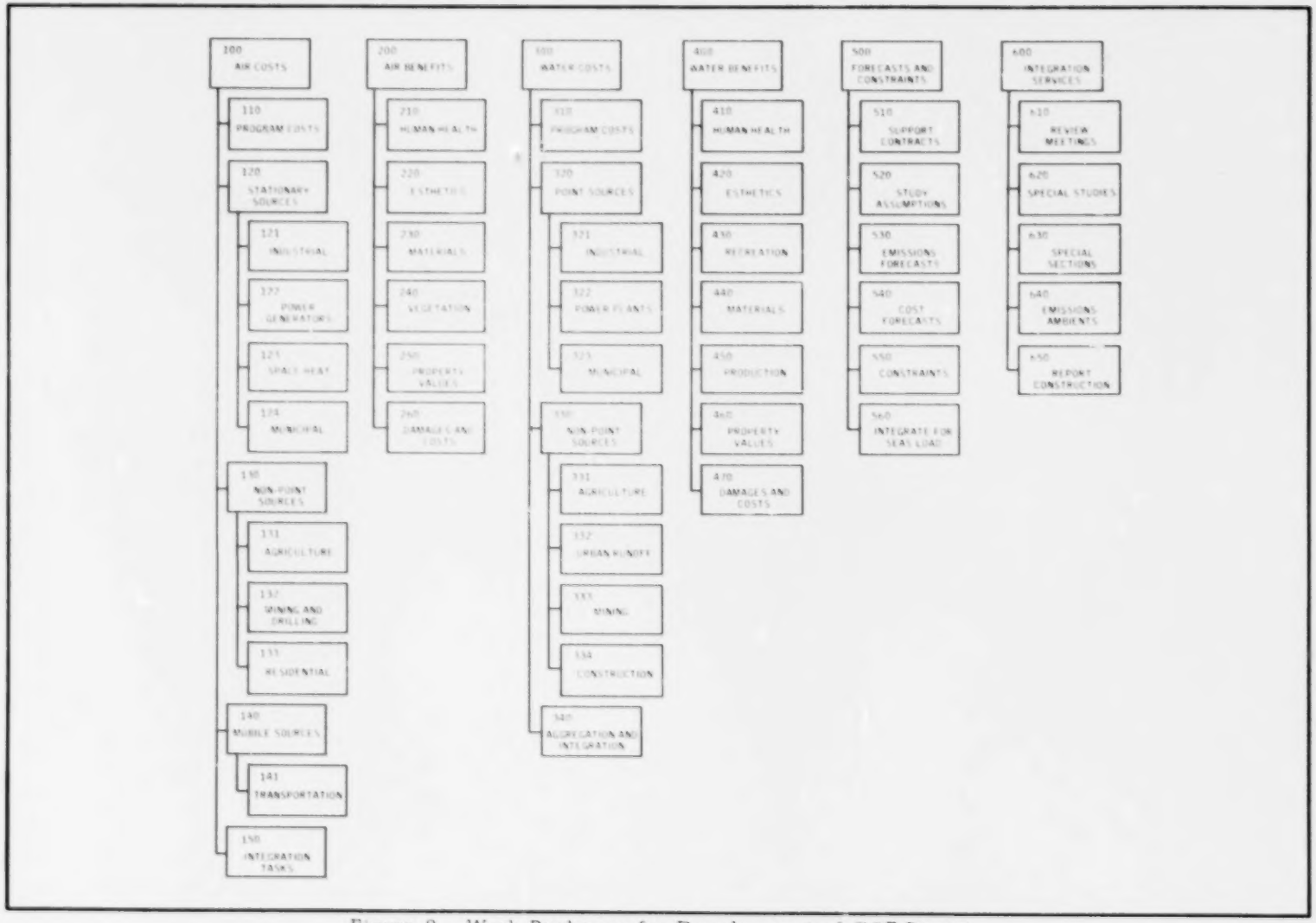


Figure 8. Work Packages for Development of CCE Report

3.2.2 General Approach

Identify those federal, state, and local programs established to reduce pollution levels to the legislated standards. Governmental programs in the areas of enforcement, research, and grants and subsidies should be considered. It should also be determined if private programs have significant costs, and if so they should be addressed.

3.2.3 Prerequisites and Interfaces

Programs directed at or related to the abatement of those pollutants identified in figure 2 are to be considered in this task. The output from this task will be integrated with abatement control costs in determining the cost of clean air.

3.2.4 Milestone Schedule

Subtask	Objective/Product	Start Date	End Date
110.1	Determine data sources: existing studies; new studies (contract process)	7/29/74	9/15/74
110.2	Prepare working paper	9/15/74	10/01/74
110.3	Determine costs	10/01/74	12/01/74
110.4	Prepare Air Program Costs Draft	12/01/74	1/01/75
110.5	Air Program Costs Final Report	1/01/75	2/01/75

3.2.5 Data Sources and Availability

Potential data sources include CEQ Reports, past Clean Air Reports, Department of Commerce, EPA Budget. Other sources to be determined in subtask 110.1.

3.2.6 Status

A description of services required for this task is contained in the RFP for Air Pollution and Cost Estimations.

3.3 PACKAGE 121, INDUSTRIAL SOURCES OF AIR POLLUTION

3.3.1 Task Description

This task will identify abatement technologies and associated cost data for industrial sources of air pollution.

3.3.2 General Approach

A series of industry studies will be conducted for the purpose of identifying information such as that contained in the Outline for Detailed Industry Studies. Minimally, for

each of the sources identified in figure 9, the following treatment data will be provided:

- Treatment efficiency
- Secondary residuals
- % of source using treatment
- Cost functions for capital, operating, and maintenance costs
- Aggregate costs to industry totals.

3.3.3 Prerequisites/Interfaces

Inputs to this task include the list of pollutants to be considered in figure 2 and in the Preliminary Study Assumptions (WP-520). Outputs from this task will be integrated with abatement costs from other sources and formatted for loading into SEAS (WP-560). Regular interaction with the integration contractor will be necessary in performing this task to ensure uniformity of report assumptions.

3.3.4 Milestone Schedule

Subtask	Objective/Product	Start Date	End Date
121.1	Preliminary Assumptions to contractor	7/29/74	8/15/74
121.2	Conduct studies	7/29/74	11/01/74
121.3	Draft report	11/01/74	1/01/75
121.4	Final report	1/01/75	2/01/75

3.3.5 Data Sources and Availability

Appropriate data sources are to be defined by the Industrial Studies research contractor.

3.3.6 Contract Status

A contract to perform the industrial source studies has been awarded to Battelle, to be completed by February 1975. The contract however, specifically excludes the following sources: clay products, surface coatings, building incinerators, and industrial incinerators. Studies of these sources will be included in WP-150.

3.4 PACKAGES 122-124, STATIONARY SOURCES OF AIR POLLUTION

3.4.1 Task Description

This task will identify abatement technologies and associated cost data for Power Generators (122), Space Heat (123), and Municipal (124) sources.

INDUSTRY SOURCES

Asphalt Batching
Carbon Black
Cement
Clay products
Coal Cleaning and Refining
Crushed Stone, Sand and Gravel
Ferroalloys Production
Forest Products
Foundries:
- Steel
- Iron (Gray, Malleable and Ductile)

Feed and Grain Milling
Grain Handling
Gray Iron Foundries
Iron and Steel
Lime Manufacturing
Natural Gas Production and Transmission
Nitric Acid
Open Burning Solid Wastes
Petroleum:
- Catylist Regeneration
- Products Storage
- Refineries

Phosphate Fertilizer
Primary Nonferrous Metallurgy:
- Copper
- Lead
- Zinc
- Aluminum

Paper and Pulp:
- Sulfate
- Sulfite
- Other Processes

Secondary Nonferrous Metallurgy:
- Aluminum
- Brass and Bronze
- Lead
- Zinc

Solvent Evaporation:
- Dry Cleaning
- Surface Coating

Sulfuric Acid

OTHER SOURCES

Building Incinerators
Industrial Incinerators
Municipal Incinerators
Sludge Incinerators for Sewage
Teepee Incinerators

Figure 9. Sources to be Studied in WP-121

3.4.2 General Approach

In this task, the integration contractor will work with the EPA/OPE staff to develop detailed source information for power generators, space heat, and municipal sources. Cost treatment data for sources in these categories will be gathered on detailed source outlines and later integrated for SEAS loading (Task 650) and creation of text (Task 660).

3.4.3 Prerequisites/Interfaces

Inputs to this task will include the list of pollutants identified in figure 2, the Preliminary Stuey Assumptions (WP-520), and in interactions with the system integration contractor.

3.4.4 Milestone Schedule

Subtask	Objective/Product	Start Date	End Date
122.1	Determine data sources	7/29/74	9/15/74
122.2	Prepare abatement cost data	9/15/74	11/01/74
122.3	Draft report	11/01/74	1/01/75
122.4	Final report	1/01/75	2/01/75

Subtasks for packages 123 and 124 are the same as for 122.

3.4.5 Data Sources and Availability

Appropriate data sources are to be defined in subtask 122.1.

3.4.6 Status

Raw data will be provided by EPA to Batelle for analysis.

3.5 PACKAGES 131-133, NON-POINT SOURCES OF AIR POLLUTION

3.5.1 Task Description

This task will provide abatement cost information from non-point sources including the following: Agriculture (131), Mining and Drilling (132), and Residential (133).

3.5.2 General Approach

The integration contractor will coordinate study efforts to gather technological cost data for non-point sources of air pollution.

3.5.3 Prerequisites/Interfaces

Inputs to this task will include the list of pollutants identified in figure 2 and preliminary report assumptions (WP-520), Outputs from this task will be integrated for SEAS loading (WP-560) and creation of text (WP-650).

3.5.4 Milestone Schedule

Subtask	Objective/Product	Start Date	End Date
131.1	Determine data sources; contact potential external sources	7/29/74	9/15/74
131.2	Contact potential external sources; gather abatement cost data	9/15/74	12/01/74
131.3	Prepare non-point draft text	12/01/74	1/01/75
131.4	Prepare detailed Non-Point Source Outline	1/01/75	2/01/75
131.5	Non-Point Source Report	1/01/75	2/01/75

Subtasks for packages 132 and 133 will proceed concurrently with those listed above for task 131.

3.5.5 Data Sources and Availability

Potential data sources for this task include previous Clean Air Reports and EPA/OPE sources. Additional sources will be determined in subtask 131.1.

3.5.6 Status

A description of services required for this task is contained in the RFP for Air Pollution and Cost Estimations.

3.6 PACKAGE 141, TRANSPORTATION SOURCES

3.6.1 Task Description

In this task, abatement control technologies and related costs will be studied for mobile sources of air pollution.

3.6.2 General Approach

As a part of this task, technologies and costs related to fuel regulations, emission control devices, and associated operating and maintenance costs will be studied. Specific emission control standards and devices will be studied to determine list prices and operating and maintenance cost increases attributable to the legislated controls.

3.6.3 Prerequisites/Interfaces

Inputs to this task include the list of pollutants identified in figure 2 and in preliminary report assumptions (WP-520).

3.6.4 Milestone Schedule

Subtask	Objective/Product	Start Date	End Date
141.1	Determine data sources; contact Department of Transportation for sources	7/29/74	9/15/74
141.2	Develop control cost data	9/15/74	12/01/74
141.3	Prepare Transportation Source Draft	12/01/74	1/01/75
141.4	Prepare Transportation Report	1/01/75	2/01/75

3.6.5 Data Sources and Availability

As part of subtask 141.1, efforts should be made to take advantage of DOT studies. Other sources include past Clean Air Reports, San Diego Case Study, and EPA/OPE sources.

3.6.6 Status

EPA/OPE is conducting transportation studies in concert with EPA laboratory in Ann Arbor, Michigan.

3.7 PACKAGE 150, AIR INTEGRATION SERVICES

3.7.1 Task Description

The purpose of this task is to integrate the air cost studies, identifying and addressing potential information gaps. Also included in this task will be the scheduling of contributions to the air costs chapter of the CCE Report.

3.7.2 General Approach

Services to be performed in this task include the following:

- Analysis of transportation studies (output from WP-141)
- Impact studies for policy alternatives
- Examine state implementation plans to assist in regional impact studies
- Develop approaches for those sources excluded by the Battelle contract
- Schedule contributions to the clean air draft
- Prepare draft material for clean air sections of the CCE Report.

3.7.3 Prerequisites/Interfaces

Performance of this task will require frequent interactions with the activities of Work Packages 110-140 and with the report integration contractor.

3.7.4 Milestone Schedule

Subtask	Objective/Product	Start Date	End Date
150.1	Prepare work paper for approach to sources excluded by Battelle	10/01/74	11/01/74
150.2	Develop detailed source data	11/01/74	1/01/75
150.3	Monitor air source studies	9/01/74	1/01/75
150.4	Analysis of transportation studies	12/01/74	2/01/75
150.5	Integrate data from source studies	1/01/75	3/01/75
150.6	Perform impact studies	3/01/75	4/01/75
150.7	Prepare text drafts for chapter V and portions of chapter III	4/01/75	5/01/75

3.7.5 Data Sources and Availability

Data sources for various subtasks will be provided by subject area study contractor or by the air integration contractor.

3.7.6 Status

An RFP for an Air Pollution and Cost Estimations contract is being developed with contract award targeted for September 1974.

3.8 PACKAGES 210-250, AIR BENEFITS

3.8.1 Task Description

These tasks identify benefits to be gained by abating air pollution to the legislated standards.

3.8.2 General Approach

The benefits to be gained occur in five areas: Human Health (210), Esthetics (220), Materials Damage (230), Vegetation (240), and Property Value (250). The benefits of pollution control are the reductions and prevented increases in pollutant damage costs. In order to determine such reductions, it will be necessary to project damage costs by:

- Assuming pollution levels resulting from no controls
- Assuming abated pollution levels resulting from legislated controls.

The ability to quantify such damage costs varies greatly within the five areas given above. The approach suggested is to identify the method(s) to be used in each area, the assumptions required by the method(s), and the results from applying the method(s).

3.8.3 Prerequisites/Interfaces

In order to forecast benefits with and without legislated controls, packages 210-250 will receive forecast pollutant levels (with and without controls) for those pollutants identified in figure 2. Using this data along with the results from the Populations Risk Study, air benefits will be determined.

3.8.4 Milestone Schedule

Subtask	Objective/Product	Start Date	End Date
210.1	Select data sources	7/19/74	10/01/74
210.2	Population Risk Study	10/15/74	2/15/75
210.3	Prepare methods work paper	10/01/74	12/15/74
210.4	Determine clean air benefits	12/14/74	2/01/75
210.5	Develop Air Benefits Draft	2/01/75	3/11/75
210.6	Develop Air Benefits Text	3/01/75	4/01/75

3.8.5 Data Sources and Availability

- Air Pollution Damages to Human Health - Hospital Costs; due July 1974.
- Air Resource Board - Damage Functions for Mobile Source Air Pollutants; due October 1974.
- WERC Staff - Activity Days Lost Due to Mobile Source Air Pollutants; due December 1974.
- EPA/WERC Contract - Populations at Risk Due to Air Pollutants; due April 1975.
- National Bureau of Economic Research - Air Pollution Health Damages from Mobile Source Pollution Episodes; due March 1975.

3.8.6 Status

An RFP has been prepared for the Population Risk Study with contract award expected by October 15, 1974. EPA/WERC currently has several people involved in studies related to the subject areas defined in Work Packages 210-250.

3.9 PACKAGE 310, WATER PROGRAM COSTS

3.9.1 Task Description

This task will identify those programs (and their associated costs) designed to carry out the provisions of the Federal Water Pollution Control Act.

3.9.2 General Approach

Identify the cost of research programs, of federal and state control programs (e.g., administrative and enforcement), and of private programs (e.g., administrative and legal) designed to meet the provisions of the Federal Water Pollution Control Act.

3.9.3 Prerequisites/Interfaces

Programs directed at or related to controlling the pollutants identified in figure 2 are to be identified in this task. The output from this task will be integrated with the results of the control cost studies (packages 321-323 and 331-334) in determining the cost of clean water.

3.9.4 Milestone Schedule

Subtask	Objective/Product	Start Date	End Date
310.1	Determine data sources; contract/ award process	7/29/74	9/15/74
310.2	Prepare working paper	9/15/74	10/01/74
310.3	Determine water program costs	10/01/74	12/01/74
310.4	Prepare Water Program Costs Draft	12/01/74	1/01/75
310.5	Water Program Costs Final Report	1/01/75	2/01/75

3.9.5 Data Sources Availability

Potential data sources include the following:

- CEQ reports
- EPA budget
- OPE personnel
- Previous clean water reports

Other sources will be determined in subtask 310.1 or by the water program costs research contractor.

3.9.6 Status

An RFP is being prepared for the services required for this task.

3.10 PACKAGES 321-322, INDUSTRIAL SOURCES OF WATER POLLUTION

3.10.1 Task Description

This task will provide information from a range of studies investigating treatment technologies used to control water pollution from industrial sources, including thermal pollution caused by power plants (WP-322).

3.10.2 General Approach

A series of studies will be conducted to identify technologies used to control water pollution at plants within selected industries. The information indicated in the outline for detailed industry studies are representative of the information required to be output from this task. In addition to the technological information, this task will study typical industrial practices for selected industries with respect to:

- Reduction of water use
- Reuse of process and treated waters
- In-process reduction of pollutants
- By-product recovery
- Plant process modifications and raw material substitutions.

3.10.3 Prerequisites/Interfaces

Inputs to this task include the list of pollutants identified in figure 2, in the Preliminary Study Assumptions (WP-520), in the Final Report Assumptions (WP-520), and interactions with the water integration contractor. Output from this task will be aggregated in package 340 to give national costs by industry.

3.10.4 Milestone Schedule

Subtask	Objective/Product	Start Date	End Date
321.1	Preliminary assumptions to contractor	7/29/74	8/15/74
321.2	Conduct studies	7/29/74	1/01/75
321.3	Final assumptions to contractor	8/15/74	11/29/74
321.4	Draft Report	12/01/74	1/01/75
321.5	Final Report	1/01/75	2/01/75

3.10.5 Data Sources and Availability

Appropriate data sources are to be defined by the research contractor.

3.10.6 Status

This task will be performed under a contract with the Center for Industrial Water Quality Management, Vanderbilt University.

3.11 PACKAGE 323, MUNICIPAL SOURCES OF WATER POLLUTION

3.11.1 Task Description

This task will provide information on municipal treatment cost data for facilities in at least the following categories:

- Secondary treatment required by the 1972 act
- More stringent treatment to meet water quality standards
- Infiltration inflow correction
- Major sewage system rehabilitation
- New collectors
- New interceptors
- Correction of combined sewer overflow
- Treatment and/or control of storm waters.

3.11.3 Prerequisites/Interfaces

Inputs to this task include the list of pollutants identified in figure 2, the Preliminary Study Assumptions (WP-520), and in the Final Report Assumptions (WP-520). Output from this task will be integrated with cost data from other sources of water pollution, and formatted for SEAS loading.

3.11.4 Milestone Schedule

Subtask	Objective/Product	Start Date	End Date
110.1	Determine data sources: existing, studies, new studies (contract award process)	7/29/74	9/15/74
110.2	Prepare working paper	9/15/74	10/01/74
110.3	Prepare municipal treatment costs data	10/01/74	12/01/74

3.11.4 Milestone Schedule (Continued)

Subtask	Objective/Product	Start Date	End Date
110.4	Draft Report	12/01/74	1/01/75
110.5	Final Report	1/01/75	2/01/75

3.11.5 Data Sources and Availability

Data sources for this task include the Needs Survey and appropriate NCWQ studies; additional sources will be determined as a part of subtask 110.1.

3.11.6 Status

The Needs Survey is currently being updated within EPA's Office of Water and Hazardous Materials. NCWQ studies are currently in progress. An RFP is being prepared for services described in this task.

3.12 PACKAGES 331-334, NON-POINT SOURCES

3.12.1 Task Description

This task will provide treatment cost information from non-point sources including the following: Agriculture (331), Urban Runoff (332), Mining (333), and Construction (334).

3.12.2 General Approach

A study will be undertaken to gather information from existing or ongoing studies both internal and external to EPA. Data on agricultural pollution sources shall include nutrients, pesticide run-off, sediments, and salinity/acidity treatment costs.

3.12.3 Prerequisites/Interfaces

Inputs to this task will include the list of pollutants identified in figure 2, and preliminary and final report assumptions. Output from the task will contribute to the text of the Cost of Clean Water section of the report and will also provide cost data to the SEAS load task.

3.12.4 Milestone Schedule

Subtask	Objective/Product	Start Date	End Date
331.1	Determine data sources; contact potential external sources; contract/ award process	7/29/74	9/15/74
331.2	Prepare working paper	9/01/74	10/01/74

3.12.4 Milestone Schedule (Continued)

Subtask	Objective/Product	Start Date	End Date
331.3	Prepare Non-Point Source treatment cost data	10/01/74	12/01/74
331.4	Prepare Non-Point Source Draft	12/01/74	1/01/75
331.5	Non-Point Source Final Report	1/01/75	2/01/75

Subtasks for packages 332-334 will proceed concurrently with those listed above for WP-331.

3.12.5 Data Sources and Availability

Potential data sources to be contacted in subtask 331.1 include the Department of Agriculture, the Water Resources Board, Development Resources, the National Commission on Water Quality, WERC contributions to the 1974 "financing report", personnel from the WERC staff, and OPE.

3.12.6 Status

An RFP is being prepared for services required of this task.

3.13 PACKAGE 340, WATER COSTS AGGREGATION AND INTEGRATION

3.13.1 Task Description

This task will provide the capability to aggregate cost data from the plant level to regional and national totals by source category code. This task will also integrate water cost data, and prepare text for cost of clean water (chapter VIII).

3.13.2 General Approach

Using cost data developed in the 300 series work packages, aggregate the data to regional and/or national levels as determined in the Report Assumptions (WP-520). Data from the various sources will then be integrated via the appropriate detailed source outlines into a format compatible with SEAS loading procedures. Text for sections of the report related to water pollution problems (Statement of the Problem) and the cost of clean water will be prepared as part of this task.

3.13.3 Prerequisites/Interfaces

Input to this task will be provided by the cost data from Work Packages 310, 321-323, and 331-334, and the Report Assumptions (WP-520).

Output from this task will be provided to the system integration contractor for SEAS loading preparation (WP-560).

3.13.4 Milestone Schedule

Subtask	Objective/Product	Start Date	End Date
340.1	Prepare working paper for aggregation techniques	9/15/74	1/01/75
340.2	Analyze/prepare detailed source outline	1/01/75	2/01/75
340.3	Work with forecast support contractor preparing data for SEAS load	2/01/75	3/01/75

3.13.5 Data Sources and Availability

Data sources for aggregation techniques will be identified by the water integration contractor.

3.13.6 Status

An RFP is being prepared for the above described services.

3.14 PACKAGES 410-460, WATER BENEFITS

3.14.1 Task Description

These tasks identify benefits to be gained by abating water pollution to the legislated standards.

3.14.2 General Approach

The primary benefits to be gained by abating water pollution occur in six general areas which make up the six work packages in series 400: Human Health (410), Esthetics (420), Recreation (430), Materials Damage (440), Production (450), and Property Values (460). The benefits of water pollution control are the reductions and prevented increases in pollutant damage costs. In order to calculate such reductions, it will be necessary to project damage costs by:

- Assuming pollution levels resulting from no controls
- Assuming abated pollution levels resulting from the legislated controls.

The problem of quantifying such damage costs as a function of pollution levels is aggravated by the fact that the sources of water pollution may often be geographically removed from the affected population. This problem requires an approach which is tied closely to the specific assumptions to be developed as a part of this task.

3.14.3 Prerequisites/Interfaces

In order to forecast benefits with and without legislated controls, packages 410-460 will receive forecast pollutant levels (with and without controls) for those pollutants identified in figure 2. Outputs from this task will contribute portions of text related to

the following sections of the CCE Report; Statement of the Problem - Effects, Water Benefits, and Tradeoff Analysis.

3.14.4 Milestone Schedule

Subtask	Objective/Product	Start Date	End Date
400.1	Select data sources; contact potential external sources	7/19/74	10/01/74
400.2	Prepare methods work paper	10/01/74	12/15/74
400.3	Determine clean water benefits	12/15/74	2/01/75
400.4	Develop Water Benefits Draft	2/01/75	3/01/75
400.5	Develop Water Benefits Text	3/01/75	4/01/75

3.14.5 Data Sources and Availability

Data for this task will be drawn from the following list of studies and papers, some of which will not be completed in time for this report, but will provide data through preliminary reports:

1. Benefits of Obtaining the 83-85 Water Quality Goals due April 1975.

2. National Estimates of Water Quality Benefits, produced by Development Planning and Research Associates, due October, 1974

3. Recreation Benefits of Water Quality Improvements, by Urban Systems Research and Engineering, Inc., due April 1975

4. Sport Fishing Benefits of Water Quality Improvement, by WERC staff, due October 1974.

5. Health Damages from Polluted Water, by Bendix Corporation, due June 1974

6. Willingness-to-Pay for Environmental Quality Improvement, by University of Pittsburgh, due December 1974

7. Value of Non-User Benefits of Water Quality Improvement, by University of California, due June 1974

8. Process Change Costs vs. Add-on Technology Costs; and Total Health Damages from Air Pollution, by WERC staff, due May 1975

3.14.6 Status

EPA/WERC is currently engaged in studies related to the subject areas defined by Work Packages 400-460.

3.15 PACKAGES 260 AND 470, ANALYSIS OF DAMAGES AND COSTS

3.15.1 Task Description

These tasks will compare pollution damage costs with pollution control costs for Air (WP-260), and Water (WP-470).

3.15.2 General Approach

In this task, members of the EPA/WERC staff will identify appropriate techniques for conducting tradeoff studies regarding pollution control policies. As a part of this task, a study will be contracted to assess the impact on control cost estimates if control levels are accomplished by process-change as opposed to add-on equipment. Development of text for chapters VI and IX will be performed as part of these tasks.

3.15.3 Prerequisites/Interfaces

Damage costs for Air (WP-210, WP-250) and for Water (WP-410, WP-460) and Control Cost Forecasts (WP-540) will be input to this task.

3.15.4 Milestone Schedule

Subtask	Objective/Product	Start Date	End Date
260.1	Identify techniques for tradeoff analysis	1/01/75	2/20/75
260.2	Tradeoff analysis studies	2/20/75	4/15/75
260.3	Prepare text for chapters IV and VI	4/15/75	5/10/75

3.15.5 Data Sources and Availability

Data sources will be selected from the lists provided in task descriptions for Work Package Series 200 and 400.

3.15.6 Status

An RFP is being prepared for the process-change study.

3.16 PACKAGE 510, FORECASTS AND CONSTRAINTS SUPPORT

3.16.1 Task Description

This task will initiate the contracting of support for the following forecasting efforts:

- Modification of the SEAS POSTCOMP and AIRCOST Modules
- SEAS run designs and executions
- Analysis of forecasts.

3.16.2 General Approach

In this task, RFP's will be developed for the above described support.

3.16.3 Prerequisites/Interfaces

This task should interact with the Report Assumptions Package (WP-520) to ensure proper statements of work.

3.16.4 Milestone Schedule

Subtask	Objective/Product	Start Date	End Date
316.1	Develop RFP's	7/29/74	8/05/74
316.2	Assess proposals/award	9/01/74	9/20/74

3.16.5 Status

RFP's are being prepared for services described in this task.

3.17 PACKAGE 520, PRELIMINARY STUDY ASSUMPTIONS

3.17.1 Task Description

This task will develop the necessary preliminary assumptions to serve as inputs for efforts in Work Package Series 100-400.

3.17.2 General Approach

Expand the list below and develop the necessary assumptions and/or recommendations.

- Determine levels of reporting for costs and benefits (national, regional, state, SMSA, county, other)
- Develop time intervals for report (Air uses 5-year interval whereas Water uses 72-77-83-85)
- Develop criteria for determining plant size (number of employees, value of output, water used, capacity)
- Depreciation rates for equipment/facilities
- Interest rates
- Potential alternatives (e.g., energy conservation)
- Forecasts and constraints data needs and interfaces
- Develop Forecast Analysis Outline

- Standardize Base Year assumptions
- Define "unit cost"
- Define impact studies.

3.17.3 Milestone Schedule

Subtask	Objective/Product	Start Date	End Date
520.1	Develop work paper identifying "decision items"	7/29/74	8/05/74
520.2	Prepare Preliminary Assumptions Draft	7/29/74	8/15/74
520.3	Prepare Final Assumptions Report	8/15/74	11/20/74

3.17.4 Data Sources and Availability

Potential data sources for this task include previous clean media reports, SEAS Data Specifications, and WERC staff discussions.

3.17.5 Status

Members of WERC and OPE are currently defining assumptions.

3.18 PACKAGE 530, INITIAL EMISSIONS FORECASTS

3.18.1 Task Description

In this task, a projected preliminary annual mass is forecast for each of the pollutants identified in figure 2, first assuming the legislated controls, and second, assuming no controls.

3.18.2 General Approach

Use SEAS to forecast annual pollutant masses. Use 1970 residual coefficients to forecast pollutant masses without controls. Use 1977 coefficients to forecast emissions with controls.

3.18.3 Prerequisites/Interfaces

The output from this task will be input to the air and water benefits work series. Depending on the results of the emission/ambient conversion study (WP-640), conversion effort may be attempted for some or all of the pollutants for use in the benefits studies.

3.18.4 Milestone Schedule

Subtask	Objective/Product	Start Date	End Date
530.1	Develop initial economic futures	10/01/74	10/15/74
530.2	Preliminary run designs and execution	10/15/74	11/10/74
530.3	Analyze forecasts and build summary tables	11/10/74	11/20/74
530.4	SEAS run designs	2/01/75	3/01/75
530.5	SEAS data load	3/03/75	3/07/75
530.6	Emission forecast execution and analysis	3/07/75	4/01/75

3.18.5 Data Sources and Availability

SEAS Documentation, data from Work Package Series 100, 300, and 500.

3.18.6 Status

Subtasks defined will be contracted as described in WP-510.

3.19 PACKAGE 540, COST FORECASTS

3.19.1 Task Description

This task will forecast abatement costs for those pollutants identified in figure 2.

3.19.2 General Approach

In this task, data from the detailed source studies will be loaded into SEAS, and the scenarios for alternate abatement technologies will be executed.

3.19.3 Prerequisites/Interfaces

Input to this will be developed in WP-560, Integrate for SEAS Load. Outputs will be analyzed for potential constraints, and will feed the Tradeoff Analysis tasks (WP-220 and WP-240). Placement of the cost data in the final report will be handled by the system integration contractor.

3.19.4 Milestone Schedule

Subtask	Objective/Product	Start Date	End Date
540.1	Modify POSTCOMP and AIRCOST	9/20/74	2/01/75
540.2	Preliminary cost forecasts	10/15/74	11/10/74

3.19.4 Milestone Schedule (Continued)

Subtask	Objective/Product	Start Date	End Date
540.3	SEAS run designs	2/01/75	3/01/75
540.4	SEAS data load	3/03/75	3/07/75
540.5	Cost forecast executions and analysis	3/07/75	4/01/75

3.19.5 Status

Subtasks will be contracted as described in WP-510.

3.20 PACKAGE 550, CONSTRAINTS

3.20.1 Task Description

This task will identify circumstances which constrain pollution abatement efforts.

3.20.2 General Approach

As a part of this task, a set of initial constraints will be developed from the analysis of emissions forecasts (Task 530) and from analysis of such factors as personnel, capital, time, resources, and technology. Technology and program cost data from the detailed source studies, and abatement cost data from the cost forecasts will be measured against the initial constraint ranges to identify additional potential constraints. The results of the constraints analysis will contribute to the Summary Chapter of the final report.

3.20.3 Prerequisites/Interfaces

Input to this task will consist of emissions forecasts, data from the detailed source studies, and cost forecast data. Output from the initial constraints analysis will be included in Report Assumptions. Output from the final constraints analysis will be developed into text for inclusion in the Summary Chapter of the final report.

3.20.4 Milestone Schedule

Subtask	Objective-Product	Start Date	End Date
550.1	Identify initial constraints ranges	9/20/74	11/20/74
550.2	Develop initial constraints from emissions forecasts	11/20/74	12/01/74
550.3	Develop abatement cost constraints	3/01/75	4/01/75
550.4	Develop constraints draft for text	4/01/75	5/01/75

3.20.5 Status

Subtasks will be contracted as described in WP-510.

3.21 PACKAGE 560, INTEGRATE FOR SEAS LOAD

3.21.1 Task Description

As data becomes available from the detailed source studies, the forecasts and constraints support contractor will monitor data preparation for SEAS loading.

3.21.2 General Approach

As a part of this task the support contractor will develop a set of procedures designed to integrate the data from the detailed source studies into a format suitable for loading into SEAS. He will then work with the detailed study contractors, in data validation and units checking to ensure that the data conforms with the preliminary assumptions.

3.21.3 Prerequisites/Interfaces

The input data for this task will be obtained from the detailed source studies.

3.21.4 Milestone Schedule

Subtask	Objective/Product	Start Date	End Date
560.1	Determine load requirements and sources	12/01/74	1/01/75
560.2	Receive data from studies/prepare for loading	1/01/75	3/01/75

3.21.5 Status

Data loading will be accomplished as part of forecast support contractor services.

3.22 PACKAGE 610, ORGANIZE REVIEW MEETINGS

3.22.1 Task Description

This task will prepare agendas for biweekly review meetings.

3.22.2 General Approach

The report integration contractor will work with the project manager and project leaders in scheduling review meetings, as described in section two of this plan. As a part of this task, agendas will be prepared and distributed to encourage participatory attendance. Study efforts will be reviewed regarding progress in meeting milestone dates and success in gathering data in conformance with report assumptions. Summaries of each meeting will be prepared and distributed to facilitate a common understanding of review results.

3.23 PACKAGE 620, SPECIAL STUDIES

3.23.1 Task Description

As the result of preliminary results of project studies, and of review meeting discussions, "information gaps" may be identified. The organizing of special studies to fill these gaps, will be coordinated with the system integration services contractor to ensure that the implementation schedule is not affected.

3.23.2 General Approach

As information gaps are identified, the integration contractor will meet with appropriate project members to define a statement of work for the special study. The study will be assessed as to its need, potential impact on the implementation schedule, and interface requirements with other studies.

3.24 PACKAGE 630, SPECIAL REPORT SECTIONS

3.24.1 Task Description

The Introductory and Appendix sections of the report will be prepared by the integration contractor.

3.24.2 General Approach

The integration contractor will gather and organize the necessary materials for preparing the Preface, Executive Summary, and Appendix sections of the report.

The relevant sections of the Clean Air Act and the Federal Water Pollution Control Act should be reviewed and discussions held with EPA staff, CEQ, and responsible agencies to determine later interpretations of the Acts. The integration contractor will prepare the text for these sections of the report.

3.25 PACKAGE 640, EMISSIONS/AMBIENT STUDY

3.25.1 Task Description

For the pollutants identified in figure 2, identify existing dispersion/rollback techniques.

3.25.2 General Approach

Through discussions with EPA/WERC staff members, determine data sources for existing dispersion/rollback techniques. Develop working paper discussing techniques and their associated problems.

3.25.3 Prerequisites/Interfaces

The results of this effort will determine the extent to which ambient levels can be supplied to the benefits studies from emission forecast outputs (WP-530).

3.25.4 Milestone Schedule

Subtask	Objective/Product	Start Date	End Date
640.1	Gather information on existing techniques	7/29/74	8/15/74
640.2	Prepare work paper	8/15/74	9/01/74
640.3	Develop procedures for implementing techniques	9/01/74	11/15/74
640.4	Apply procedures to emission outputs from WP-530	11/15/74	12/20/74

3.25.5 Data Sources and Availability

EPA/WERC staff

3.25.6 Status

CCE project manager will select WERC members to participate in this task.

3.26 PACKAGE 650, REPORT ORGANIZATION AND CONSTRUCTION

3.26.1 Task Description

In this task, the integration contractor will receive study materials and/or sections of text from the study contractors, and will organize these materials into the form of a draft text which conforms to the study outline. In addition, the integration contractor will prepare the introductory materials and appendix sections of text.

3.26.2 General Approach

Periodically, the integration contractor will review the report outline with EPA/WERC staff and study contractors. The purpose of this review process is to maintain a top-down approach to the construction of the report, rather than have the construction governed by study materials. Proposed changes to the report outline will be discussed at scheduled review meetings. As reports become available from study contractors, the integration contractor will organize and integrate materials into cohesive text which conforms to the study outline. Introductory sections (Preface and Executive Summary), Special Study Sections, and the Appendix will be prepared by the integration contractor as part of this task.

3.26.3 Milestone Schedule

Subtask	Objective/Product	Start Date	End Date
660.1	Report outline	10/01/74	12/01/74
660.2	Introductory materials	10/01/74	1/01/75

3.26.3 Milestone Schedule (Continued)

Subtask	Objective/Product	Start Date	End Date
660.3	Receive study materials/organize/ integrate	2/01/75	5/15/75
660.4	Prepare draft report	4/01/75	5/23/75

3.26.4 Status

An RFP for report integration services is being prepared.